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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER
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EDWARDS, LOREN CHARLES

ART UNIT	PAPER NUMBER
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3748

DATE MAILED: 01/03/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/658,018

Applicant(s)

SUN ET AL.

Examiner

Loren C. Edwards

Art Unit

3748

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☐ Claim(s) \_\_\_\_ is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 9-12 and 14 is/are allowed.
- 6) ☒ Claim(s) 1-8, 13 is/are rejected.
- 7) ☒ Claim(s) 13 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 9/8/03 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. ____   |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>1/5/04</u> .  | 6) <input type="checkbox"/> Other: ____                                     |

## **DETAILED ACTION**

### ***Information Disclosure Statement***

1. The information disclosure statement (IDS) submitted on 1/5/ is in compliance with the provisions of 37 CFR 1.97. Accordingly, the examiner is considering the information disclosure statement.

### ***Claim Objections***

2. Claim 13 is objected to because of the following informalities: Claim 13 is identical to claim 4. Both claims depend on the same base claim and neither have any additional claims dependent on them. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1 and 2 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Achleitner (U.S. Pat. No. 5,673,555). Achleitner discloses a method capable of being carried on a medium and executable by a computer to monitor a catalytic device coupled in an exhaust of an internal combustion engine of a vehicle, comprising: instruction for determining a lean operation time during which the engine is operated lean (Abstract; Col. 2, Lines 45-52); instructions for determining a rich operation time during which the engine is operated rich (Abstract; Col. 2, Lines 45-52); instructions for

Art Unit: 3748

determining a ratio between said lean time and said rich time (Abstract; Col. 2, Lines 53-55); and instructions for determining degradation of the catalyst based on said ratio (Abstract; Col. 2, Lines 56-58).

5. In regards to claim 2, Achleitner discloses the medium of claim 1, and further wherein said instructions for determining degradation of the catalyst based on said ratio further comprise: instructions for retrieving a stored expected ratio as a function of operating conditions; and comparing said expected ratio to said determined ratio to determine degradation of the catalyst (Col. 4, Lines 14-25).

### ***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Achleitner in view of Takahashi et al (U.S. Pat. No. 5,564,404). Achleitner discloses the medium

Art Unit: 3748

of claim 2, as described above, but fails to specifically discuss the expected ratio being stored as a function of lean time. Takahashi discloses an air/fuel ratio control system of an internal combustion engine that has a map of the relationship between the lean air/fuel time period and another engine parameter. It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the lean air/fuel ratio map as taught by Takahashi in the medium of Achleitner for the advantage of avoiding undesirable performance when ambient conditions are severe (Col. 1, Lines 45-67).

9. Claims 4-6, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Achleitner in view of Theis et al. (U.S. Pat. No. 6,497,092). In regards to claims 4-6 and 13, Achleitner discloses the medium of claim 1, as described above, but fails to specifically disclose instructions for correcting said rich operation time based on a level of richness or exhaust flow rate during said rich operation; and instructions for correcting said lean operation time based on a NO<sub>x</sub> concentration or exhaust flow rate during said lean operation. Theis disclose a NO<sub>x</sub> absorber, diagnostics, and automotive exhaust control system that corrects the rich operation time based on the level of richness and exhaust flow rate during rich operation (Fig. 8A, Steps 98, 100, 102; Col. 11, Line 58 – Col. 13, Line 31; Col. 4, Lines 23-33), and corrects the lean operation time based on a NO<sub>x</sub> concentration and exhaust flow rate during lean operation (Col. 4, Lines 23-33). It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the lean and rich period correction as taught by Theis in the medium of Achleitner for the advantage of providing accurate measure of

Art Unit: 3748

the stored NO<sub>x</sub> using measured O<sub>2</sub> sensor delay times without requiring an otherwise unnecessary separate lean/rich engine cycle (Col. 3, Lines 17-22)

10. Claims 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Achleitner in view of Irisawa et al. (U.S. Pat. No. 6,698,188). Achleitner discloses the medium of claim 1, as described above, but fails to specifically discuss the medium further comprising instructions for controlling said lean operation based on an estimate of an amount of NO<sub>x</sub> stored in the catalyst. Irisawa discloses an emission control apparatus of an internal combustion engine that changes the air-fuel ratio of the exhaust gas from lean to rich when a predetermined amount of NO<sub>x</sub> is reached in the catalyst (Col. 1, Line 18 – Col. 2, Line 16). It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the control of the air-fuel ratio in the exhaust gas as taught by Irisawa in the medium of Achleitner for the advantage of being able to detect when regeneration is complete using the existing NO<sub>x</sub> sensor (Col.1, Line 48-56).

11. In regards to claim 8, the modified Achleitner discloses the medium of claim 7, as described above, and further comprising instructions for controlling said rich operation based on a signal from an exhaust gas oxygen sensor coupled downstream of said catalyst (Col. 1, Line 18 – Col. 2, Line 16).

***Allowable Subject Matter***

12. Claims 9-12 and 14 are allowed.


***Conclusion***

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Nader et al. (U.S. Pat. No. 6,804,951) discloses an on-board diagnostic catalyst monitoring system. Yamashita et al. (U.S. Pat. No. 6,148,612) discloses an engine exhaust gas control system having NOx catalyst. Yamashita et al. (U.S. Pat. No. 5,491,975) discloses an air-fuel ratio control system for internal combustion engine.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Loren C. Edwards whose telephone number is (571) 272-2765. The examiner can normally be reached on M-TH 5:30-4.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas Denion can be reached on (571)272-4859. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
THOMAS DENION  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 3700